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Montana Environmental Public Health Tracking Network Implementation Plan 1/2006

Chapter 1: Introduction

Montana's Environmental Public Health Tracking (EPHT) network aims to provide local officials, state partners, other states, national players, and the public ready access to environmental hazard, exposure, and health effects data to facilitate development of evidence-based policies and interventions.

Montana's EPHT Network Implementation Plan (NIP) outlines the vision, purpose, and functions of Montana's EPHT network. Planning for this network is an iterative process that will continue to evolve with the planned national network and as needs arise.

This document was written by Montana EPHT staff and staff of the Informatics Section of the Public Health Improvement and Safety Bureau of the Montana Department of Public Health and Human Safety with input from the Department's Operations and Technical Division, Montana Department of Environmental Quality, and Montana State Library, Natural Resource Information Systems (NRIS).

Chapter 2: Background and context

Montana is a rural state with around 950,000 people living in an area of over 146,000 square miles. Overall Montana is rural in character with the majority of the population clustered in and around small population centers. The public health system in Montana is decentralized with 52 county and seven tribal public health departments in addition to the state health department.

Environmentally related diseases were estimated to cost Montanans over $400 million in 2003. This is a conservative estimate taking into account the cost of diseases known to have environmental contributors, such as lead poisoning, asthma, birth defects and

childhood cancer. It does not take into account environmental factors in Montana which may lead to future disease.

The Pew Environmental Health Commission report, *America's Environmental Health Gap,* used the public health tragedy surrounding asbestos exposure in Libby, Montana, to champion a national environmental health tracking program.

Following the release of the Pew report in 2000, Montana state representative Gail Gutsche introduced Montana House Bill 582 directing the Montana Department of Public Health and Human Services (DPHHS) to investigate the feasibility of a Chronic Disease Registry. The feasibility study was completed in 2002. Recommendations included standardizing databases and information systems that address hazards, exposures, and disease, enhancing capacity in environmental epidemiology, and implementing a demonstration project addressing asthma and air quality.

At the completion of the feasibility study, Montana applied for and received funding from the Centers for Disease Control and Prevention (CDC) as a Part A state to plan and build capacity for an Environmental Public Health Tracking Network.

Background on EPHT network planning

The Montana Network Implementation Plan builds on work done for Montana EPHT by Northrop Grumman in 2003-2004. Northrop Grumman conducted a state Information Technology Infrastructure Assessment (Appendix A) which outlines the IT systems at the Montana Department of Public Health and Human Services, Department of Environmental Quality (DEQ), and Natural Resource Information System (NRIS) at the Montana State Library and describes the role of the State Information Technology Services Department (ITSD). They also developed options for an EPHT Data Integration Plan (Appendix B).

As part of this work, a network of state partners from several agencies were brought together to participate in joint application design (JAD) sessions. This group has continued to meet and provided input on this plan for a cost-effective, phased-in NIP

coordinated with the development of the State's NEDSS-compatible system.

Initial efforts to enhance public health databases with relevance to EPHT and the NIP include developing a lead exposure database. Blood lead levels reported to the State are now managed in a data system which facilitates geocoding and is NEDSS compatible in addition to allowing data queries and generating reports. The next phase of this project is to develop secure web access so local health departments can access relevant data. Since there is no State lead abatement and prevention program, all outreach and prevention efforts occur at the local level. Access to this data will allow local departments to better track and follow-up cases of lead exposure.

Public health data enhancement projects also include collaborative efforts with DPHHS Vital Statistics and the Montana Birth Outcome Monitoring System (MBOMS) to geocode their records. By geocoding this data, it is more useful to the Network. Analyzing these records spatially will help focus attention to areas of increased risk. These areas can then be further assessed for known environmental factors potentially contributing to the observed health effect.

EPHT's outreach and collaborative work with local and tribal health departments has built relationships for involving local stakeholders in network efforts. EPHT has assisted 14 counties and four tribes to complete local environmental health assessments and five more sites are currently receiving training and technical assistance to conduct assessments. These assessments determine local environmental health concerns, raise awareness at the local level, and help to build local capacity to participate with EPHT. Training has been provided to these local partners in the use and gathering of currently available environmental and health information.

Universities in Montana have been important partners who will find the Network useful. A pilot linking project conducted by the University of Montana on the relationship between air quality, respiratory disease and cardiovascular disease was funded by EPHT and completed in 2004. Their recommendations included easier access to standardized hospital data currently not reported to the State. In their study, researchers had to contact each hospital and

obtain data directly. It was often difficult to retrieve historical data due to system archiving.

Chapter 3: Vision and goals

National EPHT Vision: *Healthy informed communities.*
National EPHT Mission: *Provide information from a nationwide network of integrated health and environmental data that drives actions to improve the health of communities.*

Montana EPHT Vision (created by the statewide EPHT Advisory Group): *Identify and prevent health conditions that may be caused by people's interactions with and exposures to their environment. Bridge the gap between public health and the environment through linked data, education, and collaboration*

Montana EPHT Guiding Principles:

1. *All Montanans have the right to information on disease factors to optimize their health and the health of future generations.*
2. *Prevention is a priority in promoting environmental health.*
3. *Collaboration is essential to the success of this effort.*
4. *Data utilized by the tracking network is precise, accurate, and standardized to track known and suspected environmental hazards.*
5. *Interpretations of data and recommendations are based on the preponderance of the best science, when available, and the precautionary principle*
6. *Facilitate the formulation of public policy.*

There are five National EPHT goals. Each national goal is listed, along with a brief description of related state activities.

1. Build a sustainable national Environmental Public Health Tracking Network.

Montana EPHT Network will contribute data to the national network as it develops and network implementation will be developed to allow reporting on national content of interest. The State Network will improve the use of environmental and health effects data locally

by facilitating dissemination of this information to local health departments and the public within the limitations of HIPPA.

2. Enhance EPHT workforce and infrastructure.

Sustainability of the Network depends on a trained workforce and adequate equipment, data, and tools. The Network must have a training component so local partners will know about and be able to use the data. Montana EPHT surveyed the state's public health workforce in 2004 to determine baseline use of health and environmental data. Additional surveys after the Network is in place and training conducted will determine how use has increased. Eighteen county and tribal health departments have already participated in EPHT training on using environmental and health data. These relationships will be expanded for future training.

Through Montana's Emergency Preparedness efforts, every local health department has a working computer with web access. Currently, few datasets can be accessed in an interactive web format or allow web-based reporting. As part of the staged NIP, currently static datasets will be web-enabled to allow easier exchange of information.

The Network will allow easier spatial analysis of data currently collected. Currently, few datasets have been geocoded or standardized. In addition to health data, environmental data owners such as the Montana Department of Agriculture have expressed interest in having their data on agricultural chemicals in ground water mapped and available through the Network.

3. *Disseminate information to guide policy, practice, and other actions to improve the nation's health.*

Role-based web access to the Network by advocacy groups, legislators, the medical community, universities, and the public will allow a better understanding of local conditions and can lead to developing actions to improve or protect health.

The Network will provide health and environmental information back to county and tribal health departments to help in their planning and prevention efforts. Currently data is reported from

the local to state to national level, but data is not often returned back to the local level.

4. *Advance EPH science and research.*

Access to the Network by University partners will facilitate research to inform questions about how the environment affects health. Individual pilot projects/studies will need to go through an IRB process as part of planning.

5. *Foster collaboration among health and environmental programs.*

Access to the Network by health and environmental professionals will foster interaction and collaboration through shared knowledge. Partnerships developed so far have provided synergy and mutual benefits for agencies and the public.

Montana has many communities located near state and federal superfund sites. Local requests for information on trends of health effects have often been hard to satisfy without intensive efforts. The Network can provide easier access to available data to inform the questions communities have related to their risks.

Chapter 4: Principal functions

A primary function of the Network is to disseminate information to the public and other partners. This is accomplished in two ways:
1. Through a web-based query portal directly accessible by the public. 2. By providing data to the National EPHT Network.

Web-based query portals will access and display standardized health data using role-based access and security. Metadata will be searchable. Lead exposure data will be the first public health module, followed by the Tumor Registry and other databases as determined.

Acceptance of data standards and creation of metadata for data systems in the Network will be a necessary component. Adoption of standards with regard to addresses will facilitate geocoding and spatial display of the data.

Environmental data that will be accessible by node technology is already spatially enabled and current efforts are underway to clean and de-duplicate environmental data as it becomes part of an integrated repository at our Montana DEQ. This node will allow DPHHS employees and partners access to high quality environmental data.

Chapter 5: Content

Content targeted for the state network includes birth records (including low birth weights, preterm births), birth defects registry, short-latency cancers, blood lead results, and biomonitoring results from special projects. Collecting information on asthma, developmental disabilities, degenerative neurological conditions, and learning disabilities will required further planning and may be best approached on a local or regional basis due to a decentralized public health and education systems and lack of statewide access to hospital discharge data. Efforts are underway, however, to work towards state access to hospital discharge data.

Chapter 6: Coordination and partnerships

Since 2003, Montana EPHT has been working collaboratively with Montana Department of Environmental Quality (DEQ) and Montana State Digital Library, Natural Resources Information Systems (NRIS). The Montana DEQ collects data about sites that are of environmental interest. These sites are monitored, sampled or permitted for specific activities that are regulated under state and federal environmental laws.

Most data is stored in the MT DEQ's Oracle® enterprise database (CEDARS) or other EPA mandated databases. CEDARS fulfills some DEQ programs business processes (e.g., site permitting, licensing, inspections and enforcement actions) that are supported by data concerning site location, ownership, operation and some sampling data associated with site activities.

The MT DEQ has entered into an agreement with the MT EPHT at DPHHS to share data with the goal of examining the relationships between environmental conditions and human health.

Efforts are underway to provide core site location data from CEDARS to EPHT via node technology. The core data includes information about site location, site activity, and DEQ program interest.

The substantial challenges in providing, transferring and receiving environmental data are second only to the filtering, reducing, analyzing, comparing and extracting correlations between environmental conditions and human health effects. In addition to cooperation between DEQ and DPHHS information technology groups, collaborative relationships among Montana's environmental scientists and public health analysts are required to ensure that the environmental data is interpreted in a suitable context for meaningful results. The DEQ and DPHHS will work closely together to develop and implement trading partner agreements that support this mutually beneficial relationship.

The Natural Resource Information System, a program of the Montana State Library, was established in 1983 to be a central repository for Montana's natural resource data in order to make the data more readily accessible to those who need it. NRIS collects many different types of data from state and federal agencies and uses innovative means to share it with diverse audiences. In addition, NRIS serves as the GIS clearinghouse for Montana, providing important geographic datasets to government agencies, businesses and citizens.

NRIS provides technical assistance to Montana EPHT and to local environmental assessment projects. NRIS hosts an interactive website that provides graphs and maps of data drawn from the Montana county health profiles. Plans are underway to add environmental indicators to the health profiles website. In addition, NRIS is designing a website that will provide existing geographically-referenced health and environmental data to local jurisdictions and the public as we work to develop the EPHT network.

All state agencies are required to conduct a biannual IT plans for the state Information Technology Services Department (ITSD). Montana EPHT has participated in the state IT planning process for the past two biennium by contributing to the DPHSS IT plan.

Chapter 7: Technology Overview and Implementation Steps

This chapter provides an overview of the scope of Montana EPHT Network planning and provides a high-level outline of the areas that will be emphasized from a technical and systems architecture perspective in the process of building the Montana State Network. There is an understanding that EPHT Network implementation planning will be a continuous process that does not end with this plan, but which needs to be continued throughout the network development process. The plan allows for continuous evaluation and opportunity to adapt to evolving national standards and guidelines.

Years one through three will focus on the development of the core building blocks of the Montana Environmental Public Health Tracking Network and will emphasize providing more immediate results for evaluation and study as core systems are implemented. As such, the first three plan years reflect a higher level of detail. Years 4 and 5 emphasize strategic technology planning in coordination with Montana's lead environmental health agency (Department of Environmental Quality – DEQ) and Montana's lead technology agencies (Department of Administration/State Library) for the coordinating the development of Montana's enterprise-level GIS capabilities.

A timeline of the major technical activities to be undertaken each project year is provided below.

Timeline:

Year 1 (August 2006-July 2007)

a. Continue monthly IT implementation planning group meetings with intra- and interagency partners.
b. Facilitate adoption of defined data standards by targeted databases.
c. Strategic Planning for GIS in concert with state enterprise system
d. Assess Public Health Data Store as model repository
    i. Refine data repository and data exchange needs.
    ii. Develop functional requirements
    iii. Assess data exchange applications.
        1. Data Exchange Applications included in NEDSS "toolkit" (e.g., Orion's Rhapsody)
        2. Other Options for Data Exchange (e.g. Oracle Healthcare Transaction Base)

e. Complete Proof-of-Concept Application (BLEDS)
    i. Web Access to Blood Lead Data
        1. Security
        2. Role-based Access
    ii. Deploy
    iii. Provide training
    iv. Update as needed
    v. Evaluate

Year 2 August 2007- July 2008

f. Initiate web application for Tumor Registry
g. Initiate development of web application for additional data of interest
h. Data exchange functions
    i. DEQ (NEIN)
    ii. Technical issues
    iii. Standards-based data transport
    iv. Provide training for DEQ data exchange
    v. Evaluate

Year 3

i. Complete Tumor application
    i. Deploy
    ii. Provide training
    iii. Update
    iv. Evaluate

J. Training and dissemination of information

Years 4 and 5

k Complete web portal for additional dataset of interest
    v. Deploy
    vi. Provide training
    vii. Update
    viii. Evaluate

l Overall evaluation

m Project continuity planning

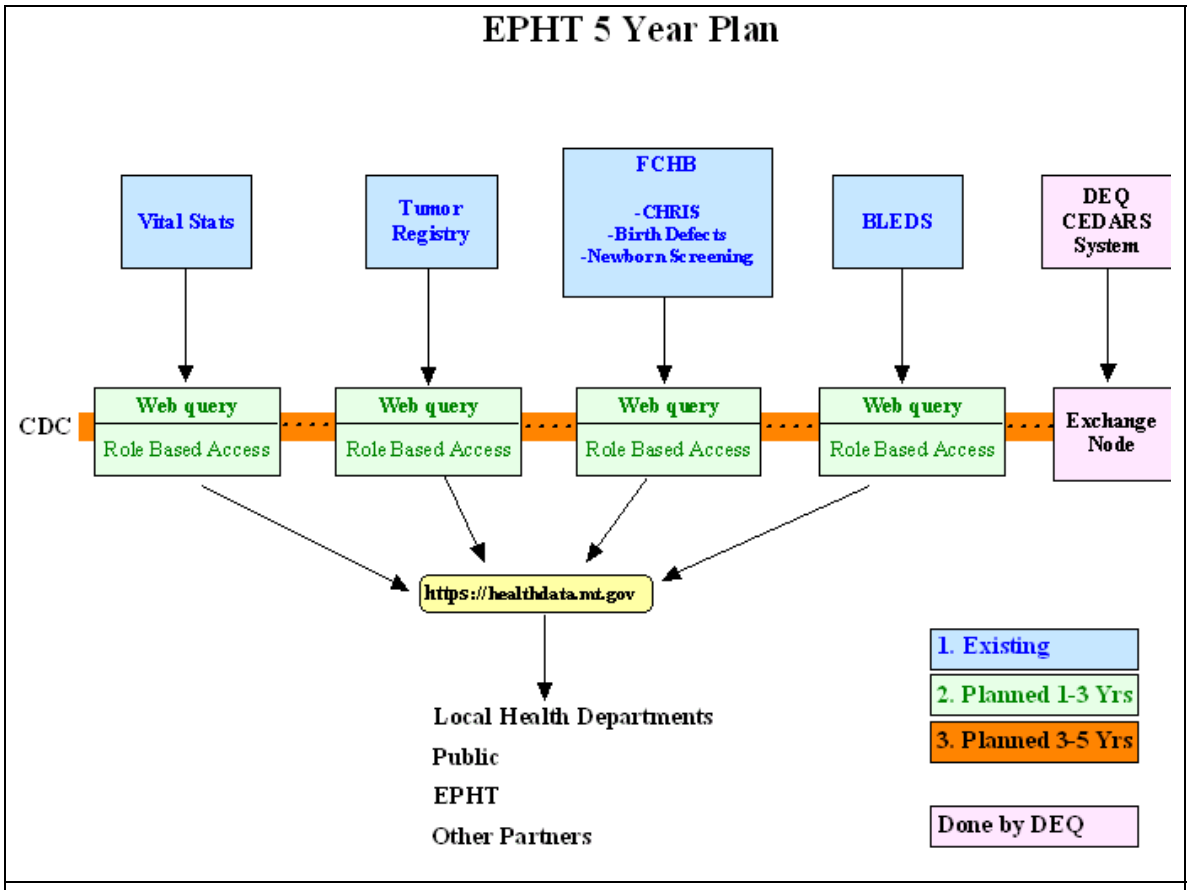

Figure 1. Overview of Montana EPHT Network- Conceptual model of data and "application" layers required to support data visualization and analysis. Existing data sources (blue) and environmental data sources (pink) will provide controlled access to data (green) and some analytical/visualization capabilities to external partners/stakeholders through GIS web-application(s) and other web services.

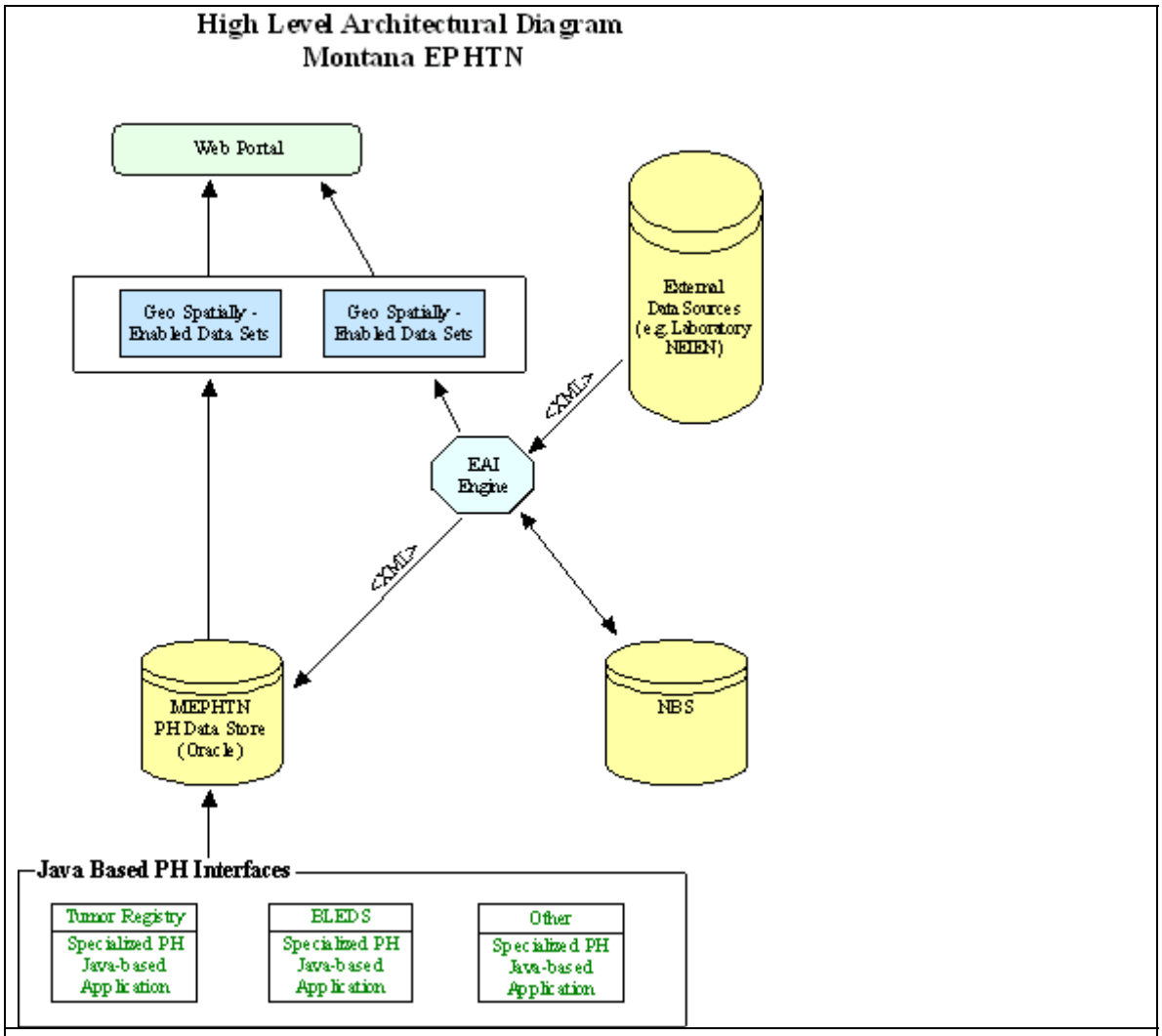

Figure 2. High-level Model of Montana EPHTN Database Architecture. Illustrates the overall server and application architecture supporting Montana EPHTN. Browser-based application front-ends support real-time data collection from key public health partner programs while providing "pre-geocoded" data to EPHTN. ETL (Extraction Translation & Loading) tools will provide a "data brokering" function. These two elements (robust data sources and EAI tools) form the base for Montana EPHT's implementation architecture.

Year 1 Narrative:

The technology action plan for year one stresses the implementation of the basic technical infrastructure and a project approach that will provide a base for the State Network. These core building blocks have been identified as the development and implementation of technology tools which will provide (1) the capacity to incorporate select databases into the Network architecture; (2) Implementation of data exchange functions; and (3) Implementation of data access functions. Key components include:

a. Continuity of Planning with Intra- and Interagency Partners

Partnerships are key to developing the Network. Continuing and expanding the IT planning committee already in place will ensure continuity between past and future efforts. Working collaboratively will assist to provide information to data owners involved in the Network, will keep EPHT up to date on IT events across state agencies, and will create synergy as many people come together to work on a common goal.

b. Adopt Data Standards in Targeted Databases

Key stakeholders in public health programs of interest will be engaged and encouraged to adopt data standards required by the Network. These include metadata and address standards. The Montana State Department of Administration completed standards development for the transportation, addressing, and critical infrastructure/structures data models for use by state and local agencies. If used, these will create a uniform implementation environment for all state agencies, including the Department of Public Health and Human Services. Adoption of these will be encouraged during application development, and existing applications within the Department will be encouraged to adopt these standards.

c. Participate in State strategic planning for GIS

GIS technology is being planned and implemented at the enterprise level in Montana. EPHT will be at the table to inform the State GIS community of our Network plans and to learn from their successes.

The Montana State Department of Administration, which has overall responsibility for the management of the State's technology resources,

has endorsed the Office of Management and Budget's (OMB) I-Team concept for assessing the status of the Federal Geographic Data Committee's (FGDC) Framework Data Themes (Cadastral, Digital Orthoimagery, Elevation & Bathymetry, Geodetic Control, Governmental Units, Hydrography, and Transportation). Montana has also identified four additional data themes (Geology, Hydrologic Units, Land Cover, Soils) which may provide unique opportunities to study environmental exposures as they are further developed and implemented. Geographic data activities are generally well-supported and have been legislatively authorized through the Montana Land Information Act that mandates the development of a geospatial strategic plan and coordination of these activities through the Department of Administration.

d. Assess Public Health Data Store (PHDS) as a NEDSS data model

An existing production database currently in use within the Montana Department of Public Health & Human Services, Montana's Public Health Data Store, will be considered as a model for the Network data repository. PHDS is consistent with the NEDSS logical data model. A production version of the database has already been developed and deployed in Montana. Developed at a cost of approximately 1.1 million dollars, the Public Health Data Store (PHDS) was designed to meet the operational and data reporting needs of State and local public health programs.

The current production version of the Public Health Data Store has been principally used to serve the needs of Maternal & Child Health public health programs at the State and local levels. However, it should be noted that the MIS vendor and principal application developer for Montana, Northrop-Grumman, used Montana's PHDS data structure as its starting point for the development of Delaware's NEDSS application. Delaware's NEDSS application is currently in full production and Montana's database backend, which had been developed earlier, served to greatly accelerate that process, as many of the elements of the NEDSS data structure had already been incorporated into and implemented within Montana's Public Health Data Store.

PHDS will be reviewed for capacity to accept EPHT data standards including defined data vocabularies and metadata. De-duplication functionality, described in the Montana "Data Integration Assessment

and Plan" (Appendix A page 6-11) and identified as "Core Service 6" has also been added to the application.

Montana's Public Health Data Store is an Oracle 9i instance implemented with both client/server and java-based front ends. The client/server interface is used for a limited amount of routine data collection, and virtually all system maintenance and/or high-end management and reporting in the system.

The Montana EPHT Network instance of the data repository will initially need to be carefully reviewed for conformance to NBS. This process will include planning for the implementation of data standards, including a capacity to incorporate defined data vocabularies and the verification of an appropriate level of functionality for the storage of metadata that will eventually be required of NEPHTN partners. Both the FGDC guidelines for metadata and the New York City Department of Health and Mental Hygiene metadata registry structure and approach will be reviewed, with the results of the assessment used to familiarize relevant public health technical staff with the data structures required for the collection and storage of appropriate metadata.

The Montana PHDS currently has the capacity to accept data from a variety of external sources and also stores the record identifier and "name" of the source database in the process, so the basic structures to support the implementation of this functionality are already present.

Security is an integral component of Montana PHDS structure and function. Montana's Public Health Data Store is a secure role-based system that currently limits access to information based on defined roles, which incorporates both the public health program and jurisdiction. Access to individual records or data tables will be very tightly controlled.

The development of data exchange components is central to the CDC NEDSS project implementation in Montana. The NEDSS Base System (NBS) will serve as our State's primary repository of communicable disease data. The Department's strategy is to retain the NBS in an unmodified form to ensure the greatest compatibility to future Program Area Modules (PAMs) that other work units may develop. Other State's that have modified their implementation of NBS have sometimes had problems incorporating changes made at the federal level by CDC into their implementation of the NBS. Our Department believes that the implementation of two primary data repositories, with

the NBS providing primary support for communicable disease and other federal reporting requirements as it is further developed, coupled with a State-level PHIN-compliant data repository to centralize data management/exchange opportunities at the State and local levels provides the most viable system over the long term.

These core data repositories will be backed by an Enterprise Application Integration (EAI) engine, where the initial focus on the use of the engine will be data transfers and updates between two or more database platforms. This will require selecting an EAI platform for DPHHS. The software selection process will be controlled by the State of Montana purchasing process which requires a substantial evaluation of options and an open process. However, DPHHS is in the process of implementing the NBS and in course of developing license agreements for that project, the Agency will be working with CDC. Currently, the commercial EAI engine that is commonly associated with the NBS implementation package, and is used in other state-level public health applications, is Orion Systems "Rhapsody" product <http://www.orionhealth.com/index.htm>.

While Montana must maintain an open software and services acquisition process, vendors of EAI engines already effectively in use within the Agency, as a result of implementing the NEDSS project, would very likely be incorporated into the process by the receipt of an initial RFI (Request for Information). An early environmental scan of the EAI market space shows that other vendor products likely to be reviewed will include Oracle's Healthcare Transaction Base <http://www.oracle.com/industries/healthcare/htb.html> and Microsoft's BizTalk Server <http://www.microsoft.com/biztalk/default.mspx> as well as other vendors who may respond to RFI requests and any RFP that may ultimately be issued as part of an open State-level process acquisition process (e.g. CrossFlo Systems - http://www.crossflo.com). The application selection process will be initiated during the current grant year, with an EAI selection process to support the Montana EPHT Network will conclude prior to the end of year 1, and implementation of the solution within the first quarter of year 2.

e. Complete Development of Proof-of-Concept Application (BLEDS)

The Blood Lead Electronic Data System (BLEDS) will be used to model the most salient features of the systems-building approach for Network development. Currently, a web-based application to monitor blood lead results reporting statewide is being created. An application prototype has been completed and work on a web-interface based on this prototype is scheduled to begin at the start of the second quarter of 2006. Interested local health public health agencies will join the project as stakeholders.

Development and implementation is occurring at present and will be complete in year one of the plan. This project will serve as an example of the creation and incorporation of select data systems into the State EPHT Network architecture.

The BLEDS application will rely on the Montana Oracle PHDS-derived backend and will use a java-based front end for the interface. Due to the development of the prototype, the majority of the functions needed by the system are already well characterized. Further, the Montana PHDS has also implemented a core set of public health application front-ends that were created to support public health programs at the State and local level. For example, the application layer has already implemented a re-usable client search capability, HIPAA-compliant client authorization, and event tracking modules, each supported by web-based forms. This provides a set of ready-made "modules" to support application development. Leveraging the initial development of the first interface will permit each subsequent interface to use the common web-forms and feature-sets needed by most public health interfaces. This will serve to greatly accelerate the application development process.

BLEDS will be deployed to local health departments, who will be trained on its use. Updates requested by the departments will be implemented as appropriate. An evaluation of the project will be completed and results taken into account for future modules.

Training for the applications and on any web-based tools developed for data visualization will be coordinated by the Montana EPHT program in conjunction with the Public Health Informatics Section and other State divisions and agencies as necessary (e.g., Operations and Technical Division of DPHHS, Department of Environmental Quality – DEQ).

Year 2 Narrative:

f. Initiate Web Application for Tumor Registry

Using the lessons learned from the BLEDS application, a web portal for tumor registry will be developed using input from multiple stakeholders. Recall that the development of BLEDS itself will benefit from java-based components already in use within existing public health applications. This "re-use" of common application components may be expected to substantially reduce the cost of application development by providing sets of ready-made modules to support the technical efforts of the State EPHT Network. Leveraging the initial development of the first interface has permitted each subsequent interface to use the common web-forms and feature-sets needed by most public health interfaces. This has served to ease the application development and deployment process for Montana PHDS in the past and will benefit the EPHT network in a like manner. These java-based interfaces are efficient, economical to maintain and deploy, and provide ready-made "templates" for future development. Using common forms, functions and other components also serves to reduce the complexity of use and simplifies training for end users as applications have a common "look and feel".

Emphasis in the more recent stages of the development and expansion of the Montana Public Health Data Store has been on meeting the core operational needs of local public health agencies. An important part of the process for EPHT will be a high-level review of the data structure to compare the current NEDSS Base System (NBS) physical database model to the current Montana Public Health Data Store structure and determine those changes that might be necessary to increase compatibility between the Montana PHDS and the NBS. This NBS-compatibility review process will be formally carried out as each application is developed.

g. Initiate development for third database

The selection of this database for development will be driven by state and national priorities and the operational readiness of the partnering organization. The emphasis will be on the provision of utility to national, state and local public health agencies and the tracking and monitoring of conditions with known environmental links. Discussions to identify and prioritize additional data sources for inclusion in the State network are already underway. Data sharing agreements will be in place prior to commencing work for any databases outside of DPHHS.

The basic systems and architecture established in year 1 and the components implemented in years 1 and 2, including the EAI, NBS and NEDSS-compatible instance of the PHDS, will serve as the basic building blocks of subsequent systems to be incorporated into the State network architecture.

h. Plan Data Exchange Functions

The Montana Department of Environmental Quality (DEQ) is planning to establish and maintain a Network Node that is securely connected to the Internet as part of the NEIEN system. They will provide a Network Node to the State EPHT Network. The node will function as the exchange point for all environmental data requests and submissions. The incorporation of the Montana DEQ Network Node into the State EPHT network is projected to take place in the final quarter of year 2. The planning process includes a continuing review of the environmental data needed for study and visualization by DPHHS, and the development of appropriate Trading Partner Agreements (TPAs) between Montana DPHHS and DEQ.

As in NEDSS/PHIN, the core of the data exchange/transport process for the Environmental Network Nodes is also based in Extensible Markup Language (XML), which is an open standard that describes data through relatively rigid syntax rules. However, XML's strength comes from its capacity to provide a standards-base through which any organization may exchange data regardless of database system or platform. XML also takes data from disparate data sets and formulates a common meaning between them. In short, XML overcomes system incompatibility by translating information into a common data structure and format.

Both Montana DEQ and DPHHS are on the same network backbone internally and have access to the same network resources, therefore it may not be necessary for DEQ to implement a full Network Node in order to provide DPHHS and the EPHT Network access to relevant data to support analysis and visualization. Once the data structures (PHDS and NBS) supporting the capture of information relevant to EPHT are in place, the capacity of the Network to access data sets for visualization will be reviewed as one of the resources available to the EPHT Network under the Montana Spatial Data Infrastructure.

Year 3 Narrative:

i. Complete Tumor Application

Following the implementation of the BLEDS (Blood Level Electronic Data System) application the Montana State Tumor Registry will be updated and deployed through a common platform (See Figure 2). One of the primary goals of the Montana EPHTN will be reached by employing this comprehensive systems approach, which calls for expanding the availability of core data sets by implementing a scalable data repository and backing that with the implementation of a data exchange solution (EAI engine). This will provide a solution that will facilitate the participation of individual program-level public health work units by permitting them to meet their immediate functional and operational requirements while also permitting the Montana EPHTN to "harvest" select sub-sets of data in near real-time for presentation and analysis. Figure 2 illustrates the overall system architecture at a high level and shows how the technical capacity to dynamically generate data layers for analysis will permit the visualization of a wide variety of data sets. Blood lead screening data from the BLEDS application will be implemented first to test the capacity of the systems and applications developed to visualize and control the presentation of data for analysis to the public. The initial visualization of the blood lead screening data will possibly be supported by the Montana State Natural Resource Information System (NRIS), a unit of the Montana State Library, which serves as a clearinghouse for the presentation of the State's geospatially-linked data <http://nris.state.mt.us/>. This will be rapidly followed by presentation of the data from the Montana State Tumor Registry when this web-based application front-end is moved to production.

j. Training and dissemination of information

The tools to display spatially-enabled data are already widespread throughout Montana State government. DPHHS has access to ArcIMS (ESRI's Internet Mapping Service) and ArcSDE (ESRI's Spatial Data Server product). These tools are also available through NRIS and the Montana Department of Administration. In short, there is no lack of technological capacity to present spatially-enabled data at the level of State enterprise in Montana. The primary limitation is an underdeveloped capacity to obtain valid, high quality data in a timely fashion. The strategy of adopting data standards promoting the collection and implementation of spatially-enabled web applications, all

based on a robust enterprise-level data platform as detailed in sections “b” and “c” will produce optimal results.

It should also be noted that substantial data analysis will be conducted in the interim, as soon as the applications capable of generating the data are put into production, with information presented in a static form through Montana EPHT’s web-pages (i.e., graphics and images generated by the desktop version of ArcGIS). Publishing data may, therefore, have several stages, but each stage will be pursued as soon as it becomes practical. DPHHS staff will be trained to use the power and flexibility of both static and dynamic web-publishing and analytical technology as new data sources are brought online or made available.

Years 4 & 5 Narrative:

k. Complete Web Portal for Additional Data of Interest

Planning for additional data to be accessed by web portals will occur in years 4 and 5. Decisions on data types will be determined again by state and national priorities. Enhancing and creating datasets with web-based reporting access supported by local public health agencies and healthcare providers allows automated data exchange and permits the data collection process to be pushed out to the field level and conducted in near real-time (e.g., clinicians entering reportable conditions into a disease or tumor registry). Linking these processes will great accelerate the turn-around time for making data available to the public and policy makers with appropriate access levels determined by database role were outlined above.

Web portals will be an important tool for communication with EPHT partners the public and also a resource for public health professionals at both the State and local levels for the visualization of data. Considered at a very high level the general characteristics required of the portal will be that it enforces security through role-based access. This means that it will essentially have an “open” component where public users without a log-in may obtain access to information of general interest and where the presentation of data is strictly controlled, and a component for public health professionals that will enforce security much more rigidly (e.g. two-factor authentication) while still controlling the accessibility of information by role after system access is granted.

l. Evaluation

Evaluation of all Network components/applications will be a continuous process at each phase to ensure that the Network meets stakeholder needs and provides information that is useful for analysis of environmental health concerns at the local, state, regional and national level and will assist to broaden dissemination of information.

m. Continuity planning

The Montana EPHT program will continue to plan for the expansion of the system. The core elements of implementing a department-level strategy for obtaining, analyzing, visualizing and presenting data will have been implemented during the first three years of the grant cycle. Technology will continue be elaborations on those basic themes. However, planning must continue as multi-agency effort, with Montana EPHT coordinating the Department's endeavors overall. This will include identifying stakeholders and continuing to incorporate new data sources into the project. The conceptual diagram presented in Figure 1 represents both the data sources and "map layers" that will be built into the portal. The Montana EPHT Network integrates the presentation and use of the data into its process with data analysis and visualization comprising the core of its approach. Training for the applications and on any web-based tools developed for data visualization will be coordinated by the Montana EPHT program in conjunction with the public health informatics section and other State agencies as necessary (e.g., Department of Environmental Quality – DEQ).

Chapter 8: Updating the Plan

It will important for Montana EPHT staff members to continue to actively participate in the Standards and Network national workgroup as well as subgroups. Staff will attend national EPHT conferences, webinars, and workshops as well as communicate with other funded EPHT states in between to stay current with the national network as it evolves. Information from the national level will inform State planning.

Montana EPHT will continue to seek input on updating the plan through continuation of a State Interagency EPHT IT working group. This group provided valuable input to this initial implementation plan and provides insights from a variety perspectives.

The Public Health Informatics Section is an additional resource available to Montana EPHTN. The Informatics Section is charged with the implementation of NEDSS in Montana and has committed to coordinating the Division's NEDSS implementation with Montana EPHTN. The Informatics Section is working toward the development of a PHIN-compliant data architecture on behalf of a number of public health programs in the Department's Public Health & Safety Division.

The statewide EPHT Advisory Group also will be asked to comment on IT planning. Information Technology was one of five components of an EPHT strategic plan developed by the group in 2005. At their last meeting there were 40 attendees with three locations participating by distance learning technology on January 26, 2006. Many of the members have been involved since formation of the group in April 2003.